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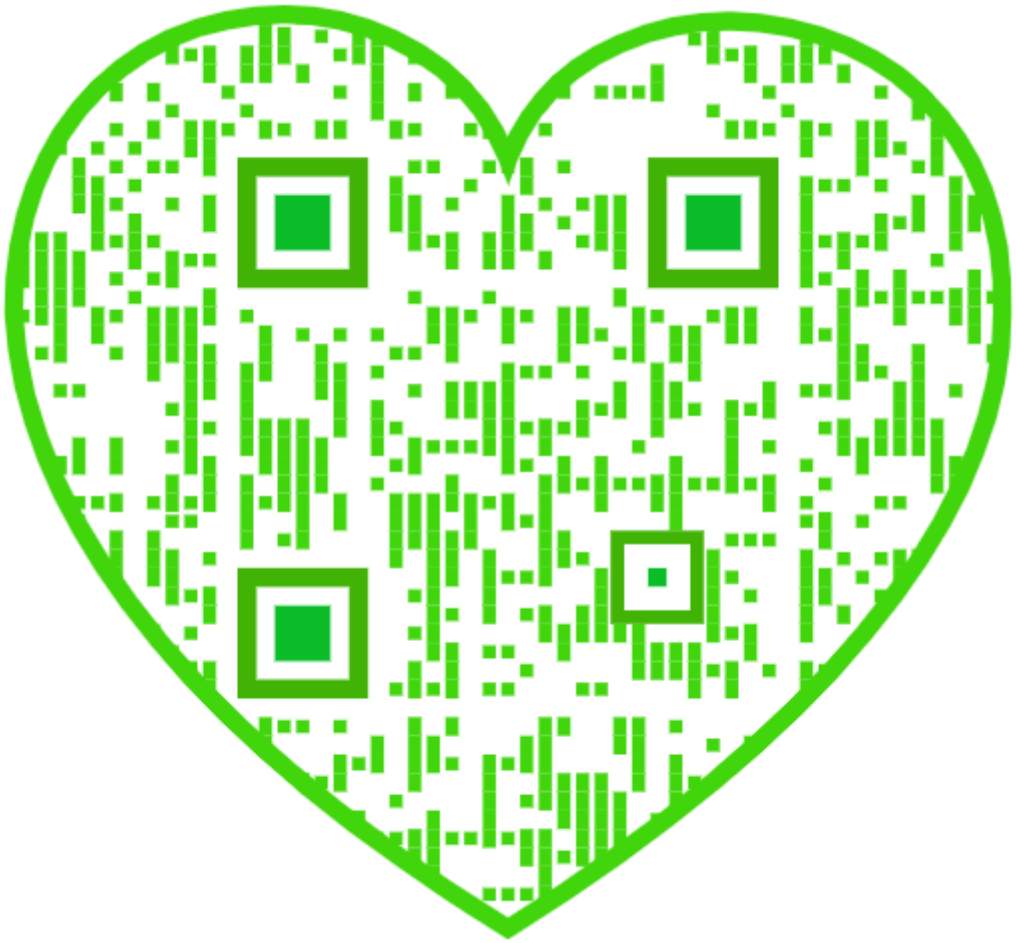
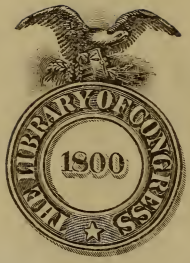
THE SANITATION OF RECREATION CAMPS AND PARKS

By HARVEY B. BASHORE





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The Sanitation of Recreation Camps and Parks

BY

DR. HARVEY B. BASHORE

Medical Inspector for Pennsylvania Department of Health

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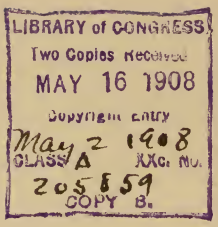

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HARVEY B. BASHORE

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TO MY NEPHEWS

R. B. S.

M. E. S., Jr.

"Nothing is so acceptable to the camper-out as a pure article in the way of woods and waters. Any admixture of human relics mars the spirit of the scene."

JOHN BURROUGHS.

"Bits of paper—newspaper at that—banana- and orange-peel, pie-crusts, any loathsome scraps of wasted food, we leave, without a thought, in the heart of the woods; or defile with them the clearest lake or stream. And this at a time of year when the radiant purity of nature is at its height, when the mere sight of a bank of lady-fern ought to send us to our knees in reverence."

ROSALIND RICHARDS.

PREFACE

THE sanitation of camps and parks is becoming a topic of vital interest, for the headwaters of many of our streams—still covered with virgin forests—have become the playgrounds of the people. "Thousands of tired, nerve-shaken, over-civilized people are beginning to find out that going to the woods is going home; that wildness is a necessity; and that mountain parks and groves are useful not only as fountains of timber and irrigation rivers but as fountains of life" (John Muir).

So when the "Red Gods" call, through the long summer months, multitudes of people of all sorts and conditions, from all corners of the country, crowd and camp in the woods, and sanitary neglect sown in these places may reap an unsuspected harvest of disease and death. One case of neglect at the fountain-head of a stream supplying water may bring disaster to those below. Let the camper forever remember the story of Plymouth, where one case—only one—of typhoid fever on the banks of a mountain stream demanded a toll of over a thousand cases and a hundred deaths; this is fact, not fancy. Not only is negligence in the woods fraught with danger to others, but the camper himself may harvest the carelessness of those who went before. "Vacation typhoid" is

the shadow that lurks in the woods when defiled by man.

The sanitation of military and labor camps is not included in this work, although the underlying sanitary principles are the same whether it be a military camp at Chickamauga or on the Manchurian frontier, a labor camp in the Alleghanies, or a hunting camp in the North Woods; the key-note of it all, or of most of it, is pure water and the proper disposal of waste. The subject of military sanitation was given a wonderful impetus by the Japanese during their recent war with Russia, and one of the best books written on the subject, and one that should be read by every one interested in sanitary progress, is "The Real Triumph of Japan," by Dr. Louis L. Seaman. The simplicity of the

Japanese sanitary arrangements—consisting in brief of the water-boiler, crematory, and mosquito-netting—should commend them to all students of military hygiene.

During the Spanish war, one of our armies—the Army of Cuban Occupation—encamped on the hills overlooking the picturesque Susquehanna near my home in Southern Pennsylvania; a more ideal spot could scarcely be imagined, yet hardly two months had elapsed before typhoid fever became such a scourge that these picked men, led by trained officers, their health guarded? by trained sanitarians, had to resort to the primitive method of the Indian and change camp.

The next year a great labor camp of two thousand or more men, made up of foreign laborers of the worst type, settled down a

few miles away; and, wonderful to say, this camp, remaining one year in the same spot, housed in shanties of the poorest and vilest construction, with no method of waste-disposal save a hole in the ground covered by a dark privy, had only three or four cases of typhoid fever, and the only sanitary care I could discover was that the engineer in charge, as soon as the camp was located, had run water-pipes all over the ground, and before every shanty was a spigot furnishing pure water; and this was probably the secret of his success.

I owe many thanks to my father, Dr. D. W. Bashore, for much kindly assistance in the preparation of this work.

West Fairview, Pa., *April 1, 1908.*

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Sanitation of Camps and Parks

CHAPTER I

LOCATION AND CONSTRUCTION

The location of a camp site is likely to be as varied as the topographical characters of the face of the earth; but the sanitary requirements are more or less the same, whether the camp be on a mountain top or prairie meadow, seashore or river bank. Even for a temporary camp one should use care and judgment; in the first place the location should have good drainage so that it cannot be readily inundated by near-by streams or by rains. Francis Parkman,

the great historian, mentions in his "Oregon Trail" how, while travelling with a wandering band of Sioux Indians, the careless selection of a camp site caused him to be flooded out during a dark and stormy night; and the result, while not turning out seriously, was more than a discomfort; in many cases, especially where women and weak children are concerned, such treatment would mean positive harm.

The camping-place should also be open, some time of the day at least, to the sun, for rain and cloudy days will come; even the heavy dews of some localities are such that by morning everything is drenched with moisture, and nothing then becomes so acceptable as sunshine. There should also be good drinking-water easily available; by good, I mean pure and free from animal contamination; better, however, walk a mile to get pure water than drink any that is impure. The location selected should be

as free as possible from insect pests, especially mosquitoes and certain flies, for these are not only a nuisance but, as will be pointed out later, become under certain conditions carriers of disease.

The observations of a Delaware Indian on the subject of a proper camping-place, quoted by Heckewelder, are very instructive and worth repeating here; although applying to times when camp life was a necessity, they are suited very well to these days when camps are more for pleasure: "The whites are not so attentive as the Indians to choosing an open dry spot for their encampment; they will at once set themselves down on any dirty and wet place, provided they are under large trees; they never look about to see which way the wind blows, so as to be able to lay the wood for their fires in such a position that the smoke may not blow on them; neither do they look up to the trees to see whether there are not dead limbs

that may fall on them while they are asleep." Much in the same strain is the advice of an old Revolutionary soldier: "Always sleep on the leeward side of the fire. True you will get the smoke, but the heat will dry up the dampness and keep you from having the rheumatiz. If you don't want your bones to ache by and by, sleep on the side where the smoke blows."

When it comes to a permanent camp, much more care and attention should be expended in selecting a location—just as much as one should exercise about any other permanent habitation. One should, to be sure, select a place in regard to the future possibility of floods and dampness; if the location happens to be near the flood-line of a neighboring stream it would be wise to collect information from the inhabitants; it may save trouble later. For example, I know a certain creek bank which usually makes a most desirable place for a tempo-

rary camp, and would seem to do splendidly for a permanent camp, but it happens that every few years this bank has been, and in the future is likely to be, flooded by great ice-gorges which would soon damage beyond repair any ordinary house. A perfectly ideal location, such as one would always like to have and which we can rarely ever get, is an elevated hillside or ridge, open to air and sunshine, facing a sheet of water, or perhaps, which is better, projecting into some lake or stream.

The nearness of marshes and swampy streams, which might exclude a place as desirable for a camp of short duration, would not forbid permanent occupation, when one could study the feasibility of future drainage. The nearness also of good drinking-water is not so necessary a factor either in a permanent camp, if we are able to consider the availability of a supply furnished by piping or by pumping with an

hydraulic ram, both of which methods are comparatively cheap and are worth thinking over in a camp with only a distant supply.

In the CONSTRUCTION of a temporary camp, whether a lean-to of boughs, a canvas tent, or an Indian tepee, the principal sanitary factors are measures to keep dry, proper sleeping arrangements, and some methods of heating and ventilation. The prevalent idea that sleeping out on the ground when camping is the right thing is fallacious, at least in this part of the country, on account of the heavy drenching dews. Even the Indian or the Leather-Stocking trapper whom the story-telling novelist loves to depict as wrapping himself in his blanket and lying down to sleep where night found him, with the stars for a canopy, is far from fact, as any one can discover who reads the accounts of Catlin or Parkman. Of course the Indian and back-

woodsman when on the "war-path" did sleep this way, as did many a white warrior since, but in ordinary home life even the Indian took great pains to have some sort of bed, and the Plains Indians in the old buffalo days had rather elaborate ones.

But why take the red camper for a model? In many respects a perfect woodsman and camper, worthy of imitation, he was careless in other respects beyond belief, and for this reason was one of the greatest sufferers imaginable from rheumatic complaints; and the few who did survive the bullet and hatchet to reach old age were so crippled and bent and tortured with rheumatism, that euthanasia, known in those times as "exposure," was welcomed as a real blessing.

The fact is, one should never sleep next to the bare ground; a bed of boughs made of hemlock or fir several feet thick and then covered with blankets, or an individ-

ual bed-tick which is easily carried and which can be filled when needed with leaves, weeds, or boughs, is a ready means of accomplishing this end; better yet is it for the tents to have board floors and cots or bunks for sleeping; it is a little more trouble, to be sure, but such additions may make camp life more comfortable and perchance may save one from illness; "roughing it" does not mean unnecessary exposure and suffering.

Some means of heating should be thought of when going camping, if only for a short time, especially in our Eastern mountain regions, for we sometimes have, in the midst of summer, cold, wet days which make fire a necessity, and an open fire in a tent of any kind except an Indian tepee is almost unbearable. Probably the best thing to take is one of the small oil heaters which are procurable everywhere, especially since kerosene

may be obtained at any country store from one end of the land to the other. With the subject of heating comes up the question of pure air, an ample amount of which we must be sure to have even in the wilderness; sleeping in a tightly closed tent, with the diminished air-space which it entails, will probably do more harm than to sleep in your own bedroom at home; it is advisable to remember this, particularly if heating a tent with an oil stove, for this consumes a vast quantity of air.

In the construction of a permanent camp, whether made of logs, slabs, boards, or stone, we use the ordinary sanitary care recommended for all buildings. First we want to keep out the moisture and the damp ground air; of course we generally have no cellar, but in lieu of this we raise the building a foot or two above the ground (Fig. 1) so as to have a free circulation of surface air; wooden posts or stone pillars

make a better and more sanitary foundation than a closed wall which permits of scarcely any change of air.

Another point in the construction of the building is to see to it that provision is made for plenty of sunlight and fresh air. The windows should be large and many; unless this is so, and the cabin or cottage has a porch on three or all four sides, which is sometimes desirable, the rooms are likely to be dark, damp, and musty. The ventilation, as mentioned before, should be thorough; it is of little benefit to go to the woods only to be cooped up all night in a stuffy room, if only for a month. The results derived from the invigorating air and sunshine during the day will be more than offset by the lack of fresh air at night.

The deleterious effects following this lack of fresh air—no matter how bracing the general climate—has been amply illustrated

FIG. 1.—SHOWING ELEVATION OF A CABIN ABOVE THE GROUND.

by the studies of Dr. Walker relative to tuberculosis among the Sioux Indians during 1878 and the following years. Dr. Walker found that as the Indians abandoned the tepee and went to live in houses, the disease gradually increased; the houses had been built in a very insanitary manner with small windows and doors, hardly admitting sufficient fresh air for two or three people, while ten or twelve crowded into this space; as a result the Indians were rapidly dying of tuberculosis—which is almost synonymous with lack of fresh air—on the very ground where the doctor was building up his own health and escaping the dread disease.

The sleeping arrangements of a permanent camp generally consist of either cots or bunks, which do splendidly in very hot weather, but if the nights are at all chilly, unless one has a superfluity of blankets, he is likely to get quite cold on the under side; the addition of mattresses, which are

now maufactured just the right size for the ordinary cot, will remedy the defect. Several years ago some of my own family were caught in a cabin in the woods during a cold northeastern storm; they had cots minus the mattresses for sleeping, and not being overburdened with blankets, they complained bitterly of the cold and of their inability to keep comfortable underneath; and one developed catarrhal pneumonia from which recovery was very, very slow. Now we always use cots plus the mattresses, and find that it adds greatly to comfort and health.

For the heating of a summer cabin or cottage nothing equals an open fireplace —perhaps made only of rough stones quarried or gathered on the land around; as it pours out the stored-up sunshine and warmth of half a century ago, it makes one feel that life is worth the living, if it is a cold, wet, or dreary world outside. When

FIG. 2.—THE TEN-PLATE STOVE, A SURVIVAL OF FRONTIER DAYS.

a fireplace is not available, some form of wood stove generally gives the most service. The old ten-plate stove (Fig. 2), a survival of frontier days, makes a very interesting addition and furnishes abundant heat. My experience with this kind of a stove has been most satisfactory not only for heating but for cooking; it is a ready method, too, of getting rid, with profit, of the scraps of wood which are so likely to litter a waste-land space. The only difficulty is that a ten-plate stove is rather hard to procure except in the long-settled parts of the country, as they are not now manufactured.

CHAPTER II

WATER-SUPPLY

The first great sanitary requisite for the camper as for every one else is a supply of pure water, and the sources of supply for the camper and the picnic party are the various springs, brooks, rivers, and lakes in their vicinity. While in Indian and Colonial times perhaps almost every spring furnished water sufficiently pure for drinking purposes, such is not now the case, and the camper even in the forests of the North will do well to look about before he puts it down that a given spring is uncontaminated. Certain it is that the ordinary wayside spring of the thickly settled States is to be handled with care.

John Burroughs, the great naturalist, in one of his books devotes a whole chapter to the subject of springs: beautiful and entertaining writing it is, but Mr. Burroughs sees a spring only through the eyes of the naturalist. Hear what he says: "Indeed, a spring is always an oasis in the desert of the fields. It is a creative and generative centre. It attracts all things to itself, the grasses, the mosses, the flowers, the wild plants, the giant trees. The walker finds it out, the camping party seek it, the pioneer builds his hut or his house near it. When the settler or squatter has found a good spring, he has found a good place to begin life; he has found the fountain-head of much that he is seeking in this world. The chances are that he has found a southern or eastern exposure, for it is a fact (?) that water does not readily flow north; the valleys mostly open the other way; and it is quite certain he has found a measure of

salubrity, for where water flows fever abideth not. Then every fountain by the roadside is a fountain of youth and of life." Such writing—fine it is, and I love to read it—is nevertheless calculated to be misleading unless one remembers that it is the pen of the naturalist and not of the sanitarian. I really know springs, and probably also does the reader, to which all that Mr. Burroughs says might apply; but such fountains are few and far between.

A spring like many other things in this world is just as good as its surroundings. If it happens to be situated on an uninhabited and uncultivated upland, it will most likely yield a pure water. If in an inhabited region, there is always a possibility of pollution. Environment is everything. It may be put down as a cardinal rule that a spring near a dwelling is in "bad company," and is very likely to suffer from its associations. In Fig. 3 is shown a spring at which

Fig. 3.—A Very Questionable Spring.

the means of contamination are so evident and so glaring that, however thoughtless and thirsty one is, he must always feel that there is here an element of danger; to use the water of a spring so situated, unless one is certain by analysis of its purity, is simply to court disaster. To argue that Tom Jones drank of this water and didn't get sick is as fallacious as the argument that Tom Jones fought at Gettysburg and didn't get shot; which may all be true, but it is also true that some thousands of others did get shot.

Fig. 4 is a photograph of a little spring which flows out from the foot of a high ridge. In this instance one might be pardoned for using the water, for there are woods and abandoned fields on all sides and not a human dwelling in sight. Yet up over the hill is a farmhouse with its attendant outbuildings, and the flow of the ground-water trends directly from the house

toward the spring. While the water of such a spring may be good and safe, one should certainly hesitate about using it.

Since springs are only overflows of the ground-water, the condition of the water depends much on the geological character of the strata through which the water passes. In considering the geology of springs, those which issue from a limestone stratum are worthy of special attention, for limestone more than any other rock is always honeycombed with caverns and crevasses innumerable which allow the passage of water from great distances without any filtering process whatsoever.

Some time since I stood beside one of these limestone springs—a very fine one indeed—and listened to a native tell of how it was fed by another spring two miles back on the mountain. The inhabitants had long noticed some connection between these springs, and finally they put lime in

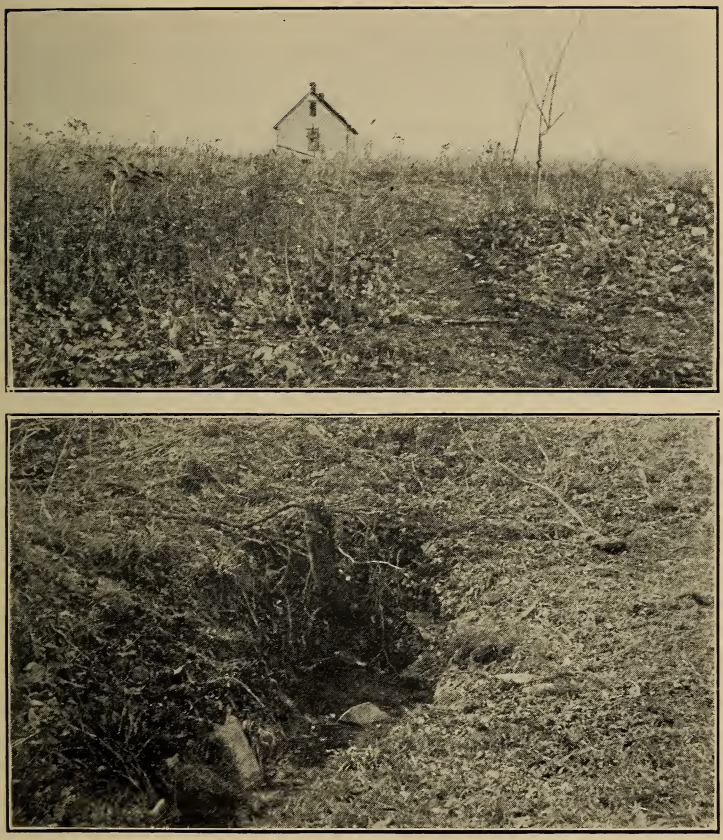

FIG. 4.—A SUSPICIOUS FOOT-HILL SPRING. THE UPPER PART OF THE PICTURE SHOWS THE VIEW FROM THE CREST OF THE HILL ABOVE THE SPRING.

the upper one, and before long the milky solution appeared in the lower one; now if any source of pollution existed at the upper spring any one can readily understand the grave danger that would arise from using the water of the lower one, although there may be no sign of habitation on its apparent drainage area.

There is recorded an epidemic of typhoid fever traced to the water of a limestone spring somewhat similar to the one just described, which was polluted by a source some eight or ten miles away. So very cavernous is a limestone region that its character is apparent to the general observer by the numerous so-called sink-holes which dot the landscape—simply surface openings to the underground passages.

I remember one fine limestone spring from which I used to drink when a boy—a famous spring known to every passer-by the region round. I also remember that

there was a sink-hole in the orchard on the bluff above so large that it was a receptacle for all the rubbish and dead cattle of the farm. There is now no doubt in my mind but that much of the material of that sink-hole finally appeared in the waters of the spring. The truth of the matter is that it is not safe to trust a limestone spring in an inhabited region unless it is high up on a divide, or unless the water has been found by bacteriological or chemical analysis to be pure. On a divide, of course, the ground-water flows in both directions, from the highest point to the nearest stream, and pollution from one side to the other would hardly take place. A region of lava overflow is said to be very much like limestone strata in its cavernous and porous properties, and in such a district the same care should be exercised in regard to the drinking-water.

When it comes to the study of other

Fig. 5.—The Wayside Brook.

strata relative to the water-supply from springs, there are different factors to encounter. Sandstone, shale, granite, and similar rock, not being cavernous, permit more or less filtration of the ground-water before it issues as a spring. Yet it has been found that seepage is very likely to follow the cleavage and fracture lines of these strata without very much filtration. Especially has this been found by the author to be true in certain regions of upturned shales, where the privies rarely become filled and where every well and spring shows gross pollution. So much for the spring; sometimes a fountain of purity as the naturalist describes it, at other times polluted by surface washings, cesspool and privy leakage, it becomes a distributor of fatal germs.

The wayside brook is another of the possible sources of water-supply for the camper, but before you drink from such

forget not that, amid the beautiful woods and the fragrant air, in this gurgling and babbling water there possibly lurks the grim spectre of typhoid. Unless you know the stream to its uttermost parts, drink not! Once some years ago I stopped to drink, and eat my lunch, by the side of a most delightful brook, which came rushing and tumbling through the rocky gorge of a towering hillside. After lunch I started up the rocks to explore this brook; through primeval purity I climbed higher and higher, in damp, dark woods and over moss-covered boulders, until at last I emerged at the very headwaters in a little clearing, right by the side of about the filthiest back yard and cow-stable I think I ever saw. Since then I have been most careful of the wayside or even the mountainside brook.

It is a curious fact mentioned by the old Indian historians that the aborigines rarely ever drank from brooks, but only at the

FIG. 6.—AN UPLAND CREEK.

fountain-heads of streams. All along the well-known trails in Colonial times the Indian stopping-places and distances were frequently noted in terms of from "spring to spring." Although this may have been due partly to the fact that the Indian trails generally kept to the ridges, and although it is a question whether the red man ever suffered from typhoid fever until the white man came, it is quite likely that he had learned by painful and accumulated experience the danger of impure water as a causative agent in the various diarrhœal troubles likely to follow its use. In Fig. 5 is shown a photograph of one of these brooks; wild and delightful, it wanders through a ravine of surpassing loveliness, yet less than a mile away there are privies and filthy back yards, and every house but one on its drainage area has had cases of typhoid fever.

When it comes to our rivers, creeks, and

lakes it is safe to say that in every case, unless in the unexplored regions of the North or the Western mountains, there is more or less constant pollution. Large fresh-water lakes in the inhabited districts are polluted only a certain distance from their shores, but at just what point at a given place and on a given day the water is pure or polluted is hard to tell. Chicago has the intake for its water-works some ten or twelve miles from shore. In Fig. 6 is shown a picture of one of our upland creeks; it looks pure and fresh and with hardly a house in sight; it is no wonder that fishermen and campers sometimes drink the water. Yet there is the gravest danger in doing so, for along the upper course of this stream there is constant fouling of its waters, as a reference to Fig. 7 will show.

And this is only one stream taken for an example because it is known to the

FIG. 7.—ON THE HEADWATERS OF AN UPLAND CREEK.

author: everywhere and anywhere in the settled parts of the country exactly similar conditions exist.

If one must drink the water of one of these streams or contaminated lakes, the best way to do is to adopt the method of the natives of India, who, taught by the experience of ages the great danger of raw water, dig small holes in the sand along the shore (Fig. 8) and then use the water which in a short time fills up the cavity. Such water, although not perfectly pure, has filtered through some feet of sand and is likely to be vastly better than the unfiltered water of the adjoining stream. Of course, if means are available, boiling the water is absolute surety against disease. We never knew, or rather never appreciated, the real value of boiled water for drinking until the late Japanese war, when the Japanese even at the front used almost invariably boiled water, and produced the astounding record

of more men killed by bullets than by the *Bacillus typhosus*.

In some large camps inhabited by a number of cottagers year after year, wells are used as a source of water. The same remarks made concerning springs apply to wells, and the same care and vigilance should be used. An instance might arise also when a camp would have an ice-supply available and not pure water; in such an instance the melted ice would probably furnish safe drinking-water, for, although ice has been known to contain living pathogenic germs for about three months, it is pretty certain that any ice you would use would be a good deal older and probably germless, or at least harmless. Above all things do not be deluded into taking into the country some patent household filter and think you have solved the drinking-water problem: such appliances are almost worse than useless when it comes to fur-

FIG. 8.—DIGGING FOR DRINKING-WATER IN THE SAND-BANK OF A POLLUTED CREEK.

nishing pure water. To be sure it will yield water which is clear and sparkling, but unfortunately "things are not always what they seem."

There are certain camps again, especially permanent camps, where rain-water might become an important factor. Suffice it to say that rain-water, collected either in a surface cistern or an underground one which does not leak and which is not polluted by surface drainage, is pure and wholesome. In our own summer camp, on account of the distance of the spring, we make use of rain-water, collected in a barrel as shown in Fig. 9, for washing and cooking, and find it wonderfully satisfactory; to be sure, all openings in the barrel, the overflow, and so on, must be screened in order to prevent mosquito-breeding.

Another item which might properly come under this chapter is Milk, for it very frequently happens that the camper has this

at hand. Now the ordinary cow-stable even far back in the country is anything but what it should be, and the preparation of the milk is far—very far—from the ideal. The rosy-cheeked milkmaid, dressed in spotless muslins, redolent with the odor of new-mown hay or wild roses, is all in the imagination of the poet and the painter—wholly different from the real article, which any one can see at almost any ordinary farm anywhere; but it may be well not to investigate such things too closely until the last day of camp. The principal thing about the milk-supply is to make inquiry, indirectly of course, as to the prevalence of typhoid fever, or any other infectious diseases among the inhabitants of the farm. If such has been present within the last year, it would indeed be the part of wisdom to forego the use of milk from that farm unless it has been boiled.

FIG. 9.—AN INEXPENSIVE AND SANITARY METHOD FOR COLLECTING RAIN-WATER.
(From "Sanitation of a Country House.")

CHAPTER III

WASTE-DISPOSAL

THE disposal of waste is the cardinal item in the sanitary care of a camp: if waste-disposal were perfect everywhere camp sanitation would become a very simple matter, and the vital question of water-supply, at least, would resolve itself into simply getting only palatable water.

I used to think that a study of aboriginal Indian life would give us valuable data about the sanitary care of a camp, for the Indians were in a way ideal campers, and our own camp life is only a return to such primitive conditions; but the more I investigated the subject the more I became convinced that the aborigines totally neg-

lected camp sanitation: indeed, all along the Atlantic coast and our great tidal rivers there are, contiguous to many known Indian-village sites, vast heaps of shells and bones, known as "kitchen-middens," of which enough remains to show the destiny of camp refuse; but the red camper rarely, perhaps, suffered for the sins of camp pollution.

In our day among a certain class of citizens there is an adage that it is "cheaper to move than to pay rent." In aboriginal life, with easily movable camps of bark and skins, it was certainly cheaper to move than to get sick, and this was about the only sanitation the red-skinned camper ever practised; and with only one inhabitant to a square mile such precautions were probably sufficient.

Waste-disposal in the camp needs no complicated arrangements; we simply make use of two things always at hand,—

fire and the soil; the nitrifyng properties of the latter soon dispose of all putrescible filth when put in proper condition, and fire soon destroys everything combustible. But the camper fresh from town, away from sewers and garbage-cans, seems at a loss to know just what to do, so he does just what the wild Indian did and throws his waste about the camp, and before long the whole surrounding soil is littered with rubbish and polluted with decomposing filth.

The principal thing to remember and to do so is to separate the waste into its component parts. First, the combustible, such as paper and egg-shells; second, the non-combustible, as tin cans and bottles; third, the putrescible part or garbage, which includes all the ordinary kitchen waste, wash-water, etc. Now as to ultimate disposal of this material. The combustible part should, of course, be burned, out in the open, if at a temporary camp without stove or fire-

place, care being taken not to set the woods on fire. Very often, indeed, after a camp has been vacated, or after a picnic, does one find the woods littered with refuse. Only to-day as I passed by the banks of a small creek, I could see paper, lunch-boxes, and scraps of food scattered everywhere,—the remains of many a picnic the day before (July 4th). How much better and how easy for each one to have raked together his refuse and set fire to it! The second part of the waste material—the non-combustible—while not exactly insanitary, is undesirable from the æsthetic point of view, and should be collected and kept in a box until some suitable time and then buried.

For the disposal of garbage one should have a regular garbage-hole; this is simply a hole dug in any near-by place, preferably screened by bushes (Fig. 10). The earth taken out is piled around it and every day

FIG. 10.—THE GARBAGE-HOLE SCREENED BY GOLDENROD AND SUMACH.

a little earth is raked into the hole covering up the garbage. There can be no question but that this method meets all sanitary requirements for ordinary private and small camps. In large military and labor camps destruction by an especially constructed furnace is probably the most economical method.

One waste there still remains to be disposed of, by far the most important, and that is human excrement. All other household refuse, garbage, and rubbish, and even the excrement of animals fall into insignificance when compared to human fæces and urine, for these and these alone are capable of transmitting the germs of typhoid fever. In the temporary camp of a week or two, if space is available and the number of campers small, it is probable that the "method of Moses" which was required of the wandering Hebrews some three thousand years ago will answer all sanitary demands, pro-

vided one keeps a considerable distance from stream and lake banks. "And thou shalt have a paddle upon thy weapon; and it shall be, when thou wilt ease thyself abroad, thou shalt dig therewith, and shalt turn back and cover that which cometh from thee" (Deut. xxiii. 13).

Another and better way to dispose of such material is to dig a trench or a small hole, something like a large post-hole, a couple of feet deep, the earth which is removed being piled around the hole. Immediately after use earth is scraped into the hole so as to cover the fecal matter; this immediate covering is very necessary, as it prevents the breeding of flies and the possible transmission of disease by such means. This fact was amply illustrated in our Spanish War, when in many of the camps typhoid fever never ceased until a "man with a gun" was placed at each sink and forced the speedy covering of all fæces.

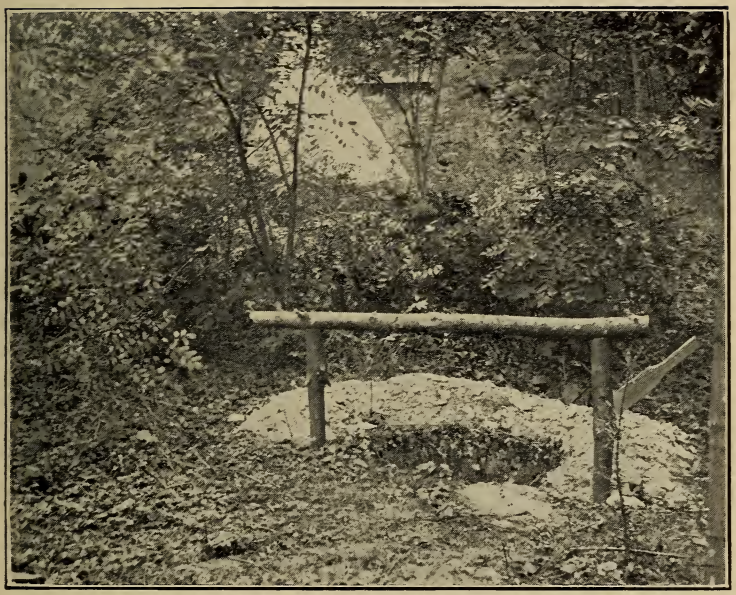

FIG. 11.—A SIMPLE CAMP-SINK.

When the hole is filled within six or eight inches of the surface it should be completely covered up with earth and another one dug; the thorough covering of the sink is absolutely necessary inasmuch as fly-eggs previously laid might develop later; and a small hole for the sink is vastly better than a large trench, for the reason that the contents of the smaller may be more readily kept covered. In a camp made up of a number of people it would perhaps be better to have several small sinks scattered at suitable places near the camp than one large one.

The seat for the sink may be of the type shown in Fig. 11, which is easily put up anywhere. If women and children are present, a seat made of a board as shown in the photograph (Fig. 12) is more desirable and satisfactory: such a seat can be transported with the other equipment and put in place by material collected at the

camp. Another contrivance is the sink-screen, which is a necessity in a mixed camp; of course in certain favored places a screen of bushes may furnish the necessary privacy, but in many places an artificial screen is necessary; this can be made very cheaply out of muslin after the method shown in the photograph (Fig. 13),—the poles being cut at the camping place.

Such is the method for the disposal of human waste in a temporary camp; for a permanent camp we can go to a little more trouble and erect a dry-closet privy, which is vastly better and more sanitary and economical than any other plan. The dry closet consists simply of a seat, a pail, and a box for holding the absorbent, which in camp would be dry earth. The pail is made of galvanized iron, or if one does not care to go to so much expense, an ordinary coal-bucket may be used. The photograph in Fig. 14 gives a general idea of the

FIG. 12.—A CAMP-SINK FOR WOMEN AND CHILDREN.

privy and its appliances, which, as has been indicated, need not be elaborate to be effective.

The earth for use in the closet is obtained from a near-by field or from the woods,—the black humus of the woods being especially efficient as a deodorant and absorbent. After use sufficient earth is put in the pail to cover the contents, and when the pail is filled it is emptied in any convenient place about the grounds, and a little earth raked over it. A person may then pass such a pile within a short time and perceive no odor. In our own camp I have at times deposited the earth-closet material within three or four feet of the cabin, in order to get its fertilizing effect on certain wild flowers (Fig. 15); and although so near no one complained of any annoyance; the last time I did this I was asked the cause of the upturned pile of earth. A dry-closet privy is almost per-

fectly odorless if treated with proper care. I have frequently had friends inspect the one shown in the picture, and the remark was generally made that the only distinguishable odor was that of the cedar shingles used in closing up the cracks between the slabs.

In order to keep a camp, especially when composed of a number of people, in a sanitary condition, it is necessary that there be some understanding among the members on this point. A good way is to have a set of rules posted in a conspicuous place, which all are expected to obey. In a boys' camp it is a splendid plan to have one do the duty of health officer, thereby not only keeping the place clean but also educating future citizens along very important and neglected lines.

The following rules are used in our own camp, and we find them very efficient. To be sure such rules should conform to

FIG. 13.—THE SINK-SCREEN: THE LOWER PART FOLDED UP TO SHOW CONSTRUCTION.

local requirements, but these will indicate in a general way what can and should be done when one "takes to the woods."

Sanitary Rules for Camp.

1. Open windows must be carefully screened.

2. No food shall stand about uncovered except at meal-time.

3. Water in brook or creek must not be used for drinking.

4. All kitchen waste, solid and liquid, must be put in the garbage-hole, and covered every evening with earth.

5. The dry-closet pail must be emptied frequently and the contents thoroughly covered with earth.

6. The camp closet must be used exclusively; even the "method of Moses" will not be tolerated about this camp.

7. No paper or rubbish shall be scattered

about the camp; such material must be collected, and burned or buried.

8. Mosquito-pools in the brook shall be treated with kerosene every ten days.

9. Weeds and grass must be kept short around the camp.

10. All dead animals found must be immediately buried.

11. For each and every violation of the above rule the fine shall be five cents, except that in the case of Rule 6 the fine shall be one dollar.

FIG. 14.—THE SANITARY ARRANGEMENTS FOR A PERMANENT CAMP.

(From "Sanitation of a Country House.")

CHAPTER IV

THE CAMP SURROUNDINGS

When a camp has been properly put up, and the water-supply and waste-disposal have been carefully attended to, there still remain other factors of sanitary importance, varying with local conditions and environments, which demand consideration. One of these subjects which is a menace not only to the pleasure but also to the health of the camper, especially in the lowlands, is the mosquito, one family of which—the *Anopheles*—may transmit malarial fever (better named, as some one has suggested, mosquito-fever), and another family—the *Stegomyia*—carry the dreaded yellow fever of the South.

The temporary camper will do well to consider the mosquito problem before he puts down his camp, for in a badly infected region life may simply become unbearable and the pleasure of the day, no matter how great, will be offset by the horrors of the night; this is not the worst either, for in the damp, dark woods and deep, narrow, wet, and sunless ravines mosquitoes are at times almost as bad during the day as during the night. I well remember a certain thick woods in a little mountain valley which I one day in summer started to penetrate and explore, but quickly turned back to acknowledge defeat on account of the swarms of "no-see-'ems," as the Indians called them.

About the only thing for the transient camper to do is to select a place which is not infested with mosquitoes, but if it happens otherwise he must take measures to protect himself with netting or a double

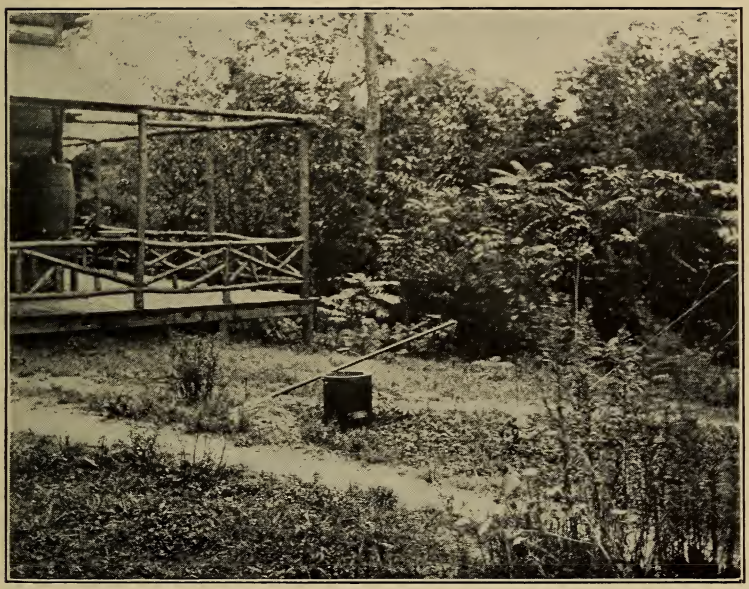

FIG. 15.—CLOSET-EARTH PROPERLY COVERED BECOMES ODORLESS.

tent; "in a malarial region this is absolutely necessary, for although intermittent fever is not usually a very serious thing in this part of the world, it is not a disease to be courted, as it does sometimes make a lasting impression on the system; in the yellow-fever belt mosquito-netting is just as necessary as food, usually rather more so. There are various "fly-dopes" sold, but I have never yet found anything that could be depended upon to do much good; smoke is probably the best means to keep the insect out of a tent or cabin, but the smoke has to be so strong that it is almost more annoying than the mosquitoes.

In the surroundings of a permanent camp we can resort to measures that will greatly lessen the mosquito evil, for, as is well known, these insects breed in stagnant water and do not fly far from the place of their birth. Of the various remedies that have been used against the mosquito, the

principal ones are drainage of the breeding-places, stocking with fish, and the treatment of the pools and ponds with kerosene.

If one has in the neighborhood an unsightly pond or puddle, or some swampy ground, its mosquito-breeding propensities can be readily eliminated by trenching and draining away the water; generally, however, one would prefer to retain a pond, and this may be made mosquito-proof by having firm, grassy banks, and then maintaining a supply of fish in the pond, many varieties of which have an unlimited capacity for mosquito larvæ. Almost any kind of fish will answer, and if the bottom of the pond should be muddy and not adapted for breeding sunfish—the kind generally used—the ordinary catfish, which inhabits and thrives in muddy streams, will quickly destroy the larvæ. The author made some experiments with catfish for this very rea-

FIG. 16.—A FAVORITE BREEDING-PLACE OF THE MALARIAL MOSQUITO.

son and found that the "wigglers" disappeared about as quickly as when any other variety of fish was used.

In the application of kerosene, one has simply to go over the locality every ten days or two weeks (ten days is probably the minimum breeding-time of the mosquito) and pour a small amount of kerosene on every pool, no matter how small. No apparatus save a bottle of kerosene is needed, and it is astonishing how little of this (about one ounce to fifteen square feet of surface) and how little time it really takes, when one gets accustomed to the work. A certain small brook about a fourth of a mile long (Fig 16) in the rock pools of which I have found at times the larvæ of the malaria-carrying *Anopheles*, has been pretty thoroughly treated in less than thirty minutes and only about two ounces of kerosene used, yet multitudes of larvæ were destroyed.

While on this subject, it is worth noticing that Livingstone, the famous African explorer, writing August, 1859, from the region about Lake Nyassa, says: "These insects (mosquitoes) are so numerous in malarial spots that their presence is considered by the natives as an evidence that the place is unhealthy." This, so long before our present knowledge of the relationship between malaria and mosquitoes, shows that aboriginal reasoning is not always fallacious, although the results are reached blindly. Livingstone's travels are valuable reading by those interested in camp life as showing the manners and customs of a primitive people, some of which, such as always moving to a new habitation after a death, have the highest sanitary significance.

Another item in regard to the mosquito problem is that the immediate camp surroundings should be kept clear of weeds and

FIG. 17.—GREAT BANKS OF RAGWEED COVER COUNTLESS MILLIONS OF MOSQUITOES.

underbrush; thick weeds and high grass make excellent harbors and hiding-places for these pests, and retain numbers that would otherwise be swept away by the winds to more remote places. I recall a well-known camping site where the great banks of ragweed cover countless millions (Fig. 17), and to pass this place at all closely during the mosquito season, especially late in the afternoon, will result in one's hands and face being literally covered with bites.

The different families of our common mosquitoes are rather easy to learn, as there are many excellent pamphlets and books published on the subject. The life-habits of all varieties are more or less similar, except that the *Anopheles* seem to give a preference to breeding-places in uncontaminated water in the country, while the ordinary house-mosquito, known as *Culex pungens*, is more of a town-dweller, and a lover of rain-barrels and offensive water. Dr.

Doty made the valuable discovery that *Culex sollicitans*, the common "salt-water" mosquito, will actually deposit its eggs by preference on the earth of the salt-water marshes, but that nevertheless these eggs will not develop until the earth is covered with water for a sufficient length of time.

Another insect danger is the fly, of which, although it wrought such havoc in our army camps during the late Spanish war, the ordinary camper need have very little fear if he watch carefully the disposal of waste, as mentioned in a former chapter. It matters not, it seems, where one camps, flies will soon begin to appear, but their numbers can be greatly diminished by cleanliness and attention to their breeding-places; and unless there are cases of typhoid fever in the neighborhood, whose discharges are available to flies, there will be little likelihood of their transmitting this disease at least. On the other hand, as

persons who have long since become well of typhoid may be "bacilli-carriers," it is necessary to keep human discharges so thoroughly covered as to be out of reach of these insects.

While thirty-six species of flies have been known to breed in human fæces, only about six of them are found to visit kitchens and food in sufficient numbers to become dangerous. Of these six, the most prominent ones are the house-fly, the little fruit-fly, and the stable-fly. Last summer I made some investigation in reference to the prevalence of flies about our own camp and found that the common house-fly was about the only one frequenting the cabin and table; likewise it was also found that if the closet-earth which was emptied on the field was thoroughly covered with earth there were absolutely no flies breeding in it; indeed, in one case in which fly-larvæ were found in the pail before emptying, after

disposal on the field and covering with earth even these failed to develop. So the fly danger in camp may be practically eliminated by the immediate and thorough covering of all fecal matter.

There is another family of flies—known as gadflies—which are a pest and at times a menace to health. The gadflies—that is, the females—are all biting insects and have been accused of transmitting malignant pustule—a form of anthrax—which is a very fatal disorder. In a little woodland ravine near our own camp these flies are, at certain times during the summer, a veritable plague, and if one tramps through the place it is almost necessary to cover up the head and neck to gain protection against their bites, which are as bad as those of the mosquito, if not worse. If the cattle of this region were infected with anthrax I should certainly be very careful of the bites of these insects, or even avoid the

place altogether; but fortunately anthrax has never appeared here. The gadflies are great water-drinkers, so that treating pools with kerosene, as in mosquito warfare, is also of value in destroying them; in fact, this method has been tried by some Russian entomologists with very gratifying results.

One other subject about the camp which deserves some consideration is that of poisonous plants, plants which unless avoided are apt to cause discomfort and trouble to those who frequent the woods. One of these is ragweed, which grows in great beds along many streams and ponds, and in late summer and autumn its pollen is one of the factors, perhaps the principal one, in causing hay-fever in those subject to this disease; such persons if locating a transient camp will do well to avoid the vicinity of these plants. At a permanent camp the proximity of ragweed does not count for

much, for all our native ragweeds are annuals, growing only for one season from the seed, so that mowing down early every summer, before the plants have time to form seed, will soon eradicate them.

A small group of plants that cause very much annoyance are certain members of the *Rhus* family—poison-ivy and poison-sumach in the East, and poison-oak in the West. As is well known, some people can handle these plants with impunity, while other persons are wonderfully susceptible. I once saw a gang of men tear out large vines of poison-ivy which had spread over the side of an abandoned hospital building: although I explained to the foreman the nature of the vine, the men went at it with ungloved hands, and not one developed any poisonous symptoms. On the other hand I know a woman who can scarcely walk near the ivy without suffering from a dermatitis; and again, I know a gentleman,

seventy years old, who spent much time in the woods and asserted that he had often handled poison-ivy without bad results, yet in his sixty-fifth year he had a rather violent attack. The poison is a volatile oil, soluble in alcohol, so if one does come inadvertently in contact with the plant the exposed skin should be thoroughly cleaned with this material. The inflammation caused by poison-ivy does not usually amount to very much, perhaps it is hardly worth mentioning, still the camper who gets a severe attack will certainly forever remember with disgust the place and the time.

Children when in the woods should also be taught to avoid the water-hemlock (*Conium maculatum*), the root of which when eaten causes violent poisoning; this plant is especially dangerous on account of the fact that it is frequently mistaken for the harmless and aromatic sweet myrrh.

The eating of the wild black cherry should be cautioned against, for while the pulp itself is harmless, swallowing the whole fruit causes poisoning from the kernels of the seeds, which form prussic acid under certain conditions. "Poisoned from eating mushrooms" is a standard newspaper item; it is hardly necessary to state that the utmost caution should be used in selecting and distinguishing the edible ones, and no person should ever make the attempt to eat mushrooms of his own selection or of the selection of any one else unless he is thoroughly conversant with the subject.

CHAPTER V

THE SANITARY CARE OF PARKS

Since the advent of the cheapened transportation brought about by electrical traction, the summer recreation-park is getting to be a factor—a growing factor—in the sanitary affairs of the country, as more and more people are annually taking such means of relaxation. In these picnic parks and groves people come and go, yet there is practically more or less continuous habitation for three months at least, and unless we use the precautions which are recognized as necessary for such cases, it is likely that we shall find these parks to be an item in the public health.

Only the other day on inquiring in re-

gard to the origin of a certain case of typhoid fever, my informant blamed a well-known picnic-grove; perhaps he was right and perhaps not. It shows at least that the people themselves are getting suspicious. As these parks are usually situated at the headwaters of streams, the proper disposal of human excrement becomes the great question, especially to those people who live on the lower reaches of the streams and who may use or expect to use the water of these same streams.

The usual method of disposal in a good many picnic-parks is to suspend the privy directly over the neighboring stream, as shown in the photograph (Fig. 18), and expect the water "to do the rest"—and the rest it does do by washing away the filth to somebody else; incidentally, perhaps, poisoning fish and mankind. Nothing, of course, could be more insanitary than such a closet. In a grove which I visited re-

FIG. 18.—THE OVERHANGING PRIVY.

cently the sanitary accommodations illustrated this method to perfection: the closet itself, overhanging a fine stream, was filthy in the extreme; piles of fecal matter lay exposed to view, and myriads of flies were feeding thereon, and then flying to the nearest eating-stall. There was an urinous odor fifty feet away advertising the place more distinctly than the painted notice; in addition there was no more privacy than on a city street. No one can deny that such a place as this is likely to become a disease-spreading focus, especially since as many as ten thousand people sometimes visit this grove in a week during midsummer. This stream, too, is being considered as the water-supply for a small borough farther down the country.

For an additional reason, as mentioned before, does the proper disposal of fæces become of the gravest importance, namely, in certain unknown cases of typhoid fever

the bowel discharges contain the pathogenic germs for an indefinite period after the complete recovery of the patient, so that a patient actually well may be a veritable disease-producing magazine. Knowing this and allowing fecal matter—human fecal matter—to be scattered along the streams of a country is criminal negligence somewhere.

The proper closet for a picnic-grove to have, no matter in what part of the country it is situated, is a dry, water-tight cemented pit covered by a carefully constructed privy, with a ventilating-shaft of not less than eight inches in diameter, extending from the pit, on the outside of the house, to at least several feet above the roof; the seat should be provided with a lid so so to exclude flies, and the whole arrangement should be properly screened by bushes or a trellis of vines, in order to insure the necessary privacy. The contents of the closet

can be disposed of on some near-by field and composted by covering with earth, or it may be directly ploughed under for fertilizer; but such material should not be put on land where it is likely to be washed into streams.

Much more attention, too, than is usually the case should be paid to the disposal of urine. The urinal, which generally consists only of a wooden trough, soon becomes so thoroughly saturated with urine as to give notice of its proximity without a hand-board, and is about the filthiest place one could imagine. A cemented gutter would seem to the superficial observer to be an admirable substitute for the usual wooden trough, but it is far from it, for anything but glazed porcelain soon becomes offensive under such conditions, and porcelain is hardly to be thought of in the woods.

The dry method of urine disposal, as

recommended by the late Dr. Poore of England, is ideal in simplicity and sanitary results for groves and parks, and is to be recommended strongly for all such places. This method consists in simply making use of the nitrifying properties of the soil. Over a space about two feet wide and six or eight feet long, depending on the needs of the grove, the soil is turned up with a spade as in digging a garden-bed, and into this trench the urine is received; and here it is quickly and inoffensively destroyed by aeration and the nitrifying germs which are present everywhere in the upper soil layers. Ashes, sawdust, peat, or even lime may be mixed with the soil in the trench, but it is hardly necessary if the soil is at all loose and absorbent. If the place is much visited the soil should be turned up with a shovel or hoe every week or two. The urinal should adjoin the privy, be open on the top to let in sunlight,

and divided into suitable compartments; but care should be taken in the construction to arrange the woodwork so that it does not become liable to saturation with urine.

Another fact about the proper disposal of urine which it is worth while to remember is that the urine of many, perhaps most, typhoid-fever patients is likely to contain virulent germs for a considerable time after recovery; so that promiscuous urination on the grounds should be prohibited especially near a stream; the "Commit No Nuisance" notice should be posted in all likely places. It would be a wise precaution to have the whole grove placed under the care of a sanitary official, which duties could be intrusted to the ordinary police officer after receiving suitable instruction. Proper attention should also be paid to the disposal of such household waste as may exist—refuse from fruit-stands, eating-places, etc.;

everything of putrescible nature should be buried or burned.

The exposure of food is another insanitary factor of the picnic-grove, on account of the dust and numerous flies; sometimes these groves become so trodden that in dry weather, with the least wind, great clouds of dust are hurled everywhere. This dust, sprinkled with the expectoration of many people a certain number of whom are possibly infected with the tuberculosis bacillus, becomes quite a factor in the sanitary condition of exposed foods. The dust nuisance and danger can be readily abated by sprinkling, and this should be carefully attended to when the occasion arises; in addition the sanitary authority should forbid the unnecessary exposure of all foods.

We frequently see tables containing such eatables as melons, cut and ready for serving, exposed to dust, flies, and even accidental expectoration for at least half a

day; sometimes mosquito-netting is thrown over the table for protection against flies, but this only creates a sense of false security in that it keeps away the large flies, while the little fruit-flies which can get through any kind of netting are the very ones most likely to frequent these food-stalls. Food that is eaten uncooked should never be exposed to view in public places, except in glass cases. The picnic lemonade-tub with its aniline-colored liquid and huge piece of ice floating about looks cool and refreshing, but before partaking of its contents one would better consider the filth it probably contains.

Another sanitary problem to be considered in picnic-groves is the water-supply. Fortunately a good many of our pleasure-parks, situated on wild and uninhabited uplands at the fountain-heads of the lowland streams, still furnish good drinking-water, and in very few instances has trouble

L. of C.

been traced to this source; but with increasing population, and the same amount of carelessness as we have been accustomed to in the past, it will not always remain so; sooner or later we will get to the danger-point. The precautions mentioned in Chapter II should be carefully followed in regard to the water-supply of each and every park or grove—pure and uncontaminated water is what we want whether in city or camp or pleasure-ground. The proprietors of our much-frequented parks should be held accountable, just as public water companies, for the kind of water furnished their patrons.

In Fig. 19 is shown the photograph of a spring which supplies the drinking-water for a well-known trolley park in central Pennsylvania. The small town adjoining one side of the spring has no method of sewage disposal except the old-fashioned privy which adorns each back yard, and

Fig. 19.—A Trolley-park Spring.

this in a limestone region which is cavernous to a great extent. Yet the natives of this place would think you demented if you questioned the purity of that spring. Recently, however, the bacteriologists have found *Colon bacilli* in the water, and the day will surely come—come perhaps like a bolt out of a clear sky—when this spring will scatter disease, unless its environment is considerably changed; and then when that day comes the inquiring sanitarian will be met with the reply that our fathers and our grandfathers drank from this spring and it never sickened them. But this false reasoning will lead down into the grave of a stricken community. Such it has been and such it will be until sanitary science and sanitary laws guard the welfare of the people.

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